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THE BENEFITS AVIATION PSYCHOLOGISTS OFFER
OPERATIONAL COMMANDERS:
AN ANALYSIS AND DISCUSSION

by

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Preface

The following project was undertaken to highlight the important benefits aviation psychologists provide operational commanders and members of the flying community. There is an apparent gap between aeropsychology needs and the limited number of providers in the field with aerospace psychology knowledge and training. My professional experiences and feedback from other aeromedical specialists also indicates there is an apparent lack of understanding by aviation commanders and senior wing leadership about how mental health services may be a force enabler for their squadrons. However, once educated about the plethora of aeropsychology services available, most leaders seem receptive. Thus, training of providers and education of the aviation community are both crucial. The current paper discusses these issues and focuses on the lessons learned from Operation ALLIED FORCE over Serbia in order to further highlight issues relevant to aviators. The author would like to acknowledge the assistance of Air Command and Staff College faculty research advisor Lt. Col. Marshall Cobb and Ann Huffman of the United States Army Europe Medical Research Unit. Without their help this project would clearly not have been possible. I would also like to thank all the subjects participating in Operation ALLIED FORCE who willingly gave their time and effort to complete the survey. Lastly, I would like to thank the various individuals who provided the technical and historical data used in this project.

Abstract

The United States Air Force has numerous innovative weapon systems. Military personnel operate many of these systems, and they possess their own inherent strengths and weaknesses. Thus, people are a common variable in most weapons, whether through development, programming, or operation. The “human weapon system” also shares common features with all other weapons. It is fallible, influenced by external factors, and requires periodic maintenance.

Military aviators present unique challenges to mental health providers. Unfortunately, there is a chronic stigma attached to seeking mental health services, so many individuals in need of help go untreated. Pilots as a group resist mental health programs or any other treatment that may result in loss of flight status. Thus, aeromedical psychology provides a crucial buffer for aircrews. However, aviation psychology is more than simply providing traditional mental health services to flyers, something many mental health providers fail to understand. Just as aviation squadron commanders and senior wing leaders often do not fully understand the plethora of benefits aviation psychologists can provide, traditional mental health providers typically are naïve about combat aviation and the divergent needs/issues relevant to aircrews.

A total of 540 military personnel stationed either permanent party or TDY at Aviano Air Base, Italy, during Operation ALLIED FORCE between 24 Mar - 10 Jun 1999 completed a two-page questionnaire assessing various issues. Participants were administered a two-page, 65-item self-report questionnaire that assessed various issues, including demographics, previous deployments, sleep, morale, psychological well-being, wellness behaviors, physical health

symptoms, job attitudes, and work-family conflict. The current study examined subjective reports of differences in alcohol use, sleep, morale/motivation, and work-family conflict among aviators and non-rated officers. Levels of personal morale, unit morale, and unit cohesion were all reportedly higher among aircrew members. Aviators also reported higher levels of motivation and work-family conflict, although these differences were not statistically significant. Aviators reported significantly more hours of sleep per night than non-rated officers. There were no significant differences regarding alcohol consumption between aircrews and non-rated officers, and neither group appeared to abuse alcohol. Results of the study are consistent with prior research on US Army personnel suggesting both negative and positive aspects of deployments on personnel and mission readiness. Based upon the results of this study and previous research, there is a disconnect between the need for services and the number of trained aviation psychologists within the USAF that can only be addressed by increased recruitment, incentives, and training for Air Force mental health providers.

Chapter 1

Introduction

I believe very strongly that leadership has a responsibility to get their people the resources to do their job. I look at [mental health help] as another tool that's available...we should not make tools available for people to use then punish them when they use them, or put some stigma on them.

—General Ronald R. Fogleman
Former USAF Chief of Staff¹

The United States Air Force has numerous innovative weapon systems. Military personnel develop, program, and/or operate all of these systems, and humans possess their own inherent strengths and weaknesses. Thus, people must be considered one of the most vital components of the weapon systems in our military arsenal. The “human weapon system” also shares common features with all other weapons. It is fallible (i.e. subject to errors), influenced both positively and negatively by external factors, and requires periodic maintenance. The indispensable human weapon system should not be neglected, since this is likely to result in disastrous consequences. In my experience, the cost of repairs to any damaged system, whether human or mechanical, is often far more expensive than the cost of preventive maintenance.

Emphasis on proactive services and expeditionary medical care/support is consistent with two of the Air Force Medical Service core competencies, Medical Care in Contingency Operations and Human Performance Sustainment and Enhancement.² Cooperation and collaboration between care providers and commanders is essential to maintain the fighting force and increase overall human performance. Whether at deployed locations, geographically

separated units, or established home bases, health care professionals must be prepared to address medical issues within their assigned area of responsibility. In order to accomplish this task, professionals must understand the needs of the population to whom they are providing care.

Military aviators are remarkably adept at “compartmentalizing” tasks and minimizing extraneous circumstance interference with duty requirements.³ These individuals are recognized as “high stress copers” who are willing and able to accept a certain degree of risk in order to be effective combat pilots.⁴ However, aviators are not superhuman. Personal issues and the stress of combat can and do impact concentration and flight performance. Prevention is essential and formal mental health (and specifically aviation psychology) interventions are necessary for some individuals. In FY00 there were 22 aviation mishaps throughout the Air Force, resulting in 14 destroyed aircraft and 7 fatalities.⁵ An analysis of historical data over time reveals almost half of all safety investigations of the more serious Class A mishaps, those accidents resulting at least \$1million damage or loss of life, mention psychological factors involving one or more of the crewmembers.⁶ This data further highlights the importance of treating aviators in order to reduce risks to individuals or mission effectiveness.

There is a long-standing stigma attached to seeking mental health services, especially among aviators and others in special duty status (e.g. PRP).⁷ Understandably, pilots are apprehensive regarding anything possibly resulting in Duties Not to Include Flying (DNIF). Loss of flight status may result from certain medications, life circumstances, or an altered mental status that could potentially adversely impact safe operation of the aircraft. Thus, aviators’ concerns are related to medical treatment in general, but their apprehension certainly increases with mental health services given their combination of negative stigma and potential to remove the member from flying status.

In the cockpit, aviator qualities of confidence, intelligence, task-focus and compartmentalization are extremely productive given the extreme duties they perform, including combat and risking their lives. Unfortunately, aviators, like other individuals, are not always able to successfully separate personal life stressors from regular duty demands. Pilots also live in a relatively “closed” society, meaning while aviators are typically accepted by other flyers, they are wary of “outsiders” to their established network. Seeking help is viewed, whether accurately or not, as a sign of weakness/vulnerability and something incompatible with aviation duties.

Aeromedical psychology is a crucial buffer for aircrews, given military stressors and the fact aviation is considered one of the most stressful occupations.⁸ For safety reasons, this is even more critical considering the increasing pilot shortage. The Rand Corporation estimates a near 15 percent deficit in necessary Air Force pilots by next fiscal year.⁹ Consequently, aircrews and support crews are continually being forced to “do more with less,” thus increasing the level of safety risks associated with an “overworked” and downsized force. Increasingly, commanders are turning to their medical support personnel, especially mental health providers, for help and preventive interventions. However, many mental health providers fail to understand that aviation psychology is more than simply providing traditional mental health services to flyers. Aviators face unique challenges, and many of them are understandably hesitant to seek services for fear of losing their flying status. Thus, providers must think “outside the box” when dealing with this population.

Flight psychology is defined as the application of psychological principles to the unique environment of the aviator to enhance training, flight safety, and mission effectiveness.¹⁰ As specialty consultants to commanders and medical providers, aviation psychologists work closely

with Flight Surgeons, so a positive rapport between mental health and flight medicine is essential. Collegial and cooperative relationships better serve operational commanders and the flying community. It should also be noted that mental health providers do not “ground” pilots. They simply make recommendations to Flight Surgeons. If flight surgeons do not understand or trust the aviation psychologist, they are less likely to follow the specialist’s recommendations.

Although generally very high functioning with few problems and good coping skills, fliers have a level of stress tolerance that may eventually be exceeded, overpowering their ability to compartmentalize or tolerate changes over time.¹¹ Understandably, some pilots require temporary DNIF, but even then the goal should be to return them to flying status as quickly as possible in order to facilitate doctor-client trust and minimize potential adverse squadron mission effects due to loss of personnel. In the extremely rare event an aviator is recommended for permanent grounding, the rationale for this decision should be clearly articulated to assist the flight surgeon and commander in making alternative duty arrangements or possible cross training recommendations.

Positive relationships must also be developed with the pilots, operational commanders, and senior wing leaders. Mental health professionals can not wait in their offices for aviators to seek help. Likewise, approaching aviators after a critical incident is folly when rapport has not been previously established. They will not talk honestly. Why should they? The research has shown that they do not readily trust mental health providers. Trust is established over time through regular contacts, rapport-building, and prudent clinical interventions.

Prevention efforts with aviators are critical,¹² and as stated previously, providers must “think outside the box.” Roles for aviation psychologists include education on various human factors, such as spatial disorientation, visual illusions, concentration, stress management, motion

sickness, and fatigue. This training should take place both individually and collectively. Commanders and DOs should be regularly consulted to understand their concerns and brief them on overall squadron themes (e.g. fatigue or decreasing morale). Brief instructional lectures should be provided regularly at wing or squadron flight safety meetings, so rapport with individuals in critical offices is essential.

Effective providers are extremely proactive, regularly attend squadron/wing meetings, take advantage of any and all speaking opportunities, and consistently interact with aviators within the squadron (often about issues completely unrelated to psychology). Initially, pilots should be approached cautiously, understanding their reluctance regarding mental health providers. As trust develops, they will slowly begin to divulge increasing amounts of information, always observing what the provider does with that information. Only then will mental health professionals begin to truly become effective with this elite population. Rapport building and understanding issues faced by aviators also dictates that the provider receive a flight physical, have current altitude/spin chamber cards, and fly regularly with flight crews. The sign of true acceptance often comes with a tactical “call” sign provided to the flight psychologist. This is when you have finally “arrived.”

Operation ALLIED FORCE (OAF) was unique as a campaign utilizing solely aerospace assets. This particular operation was chosen to help highlight aviation issues mental health providers may face. During ALLIED FORCE, the United States flew over half of all strike missions, and NATO forces were able to conduct air strikes 24 hours per day from all directions.¹³ The air war over Kosovo and Serbia demonstrated the possible emphasis of future campaigns: air-based wars with an attempt to eliminate friendly losses and minimize collateral damage.¹⁴ Given the importance of manned airframes in future wars, mental health personnel

must be willing and prepared to augment the human weapon system in order to prevent mission degradation and minimize risk of life loss.

Notes

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Chapter 2

Review of Relevant Issues

The influence of air power on the ability of one nation to impress its will on another in an armed conflict will be decisive.

—William “Billy” Mitchell¹

OPTEMPO and Personnel Changes

The United States Air Force and its sister services have experienced a significant reduction in personnel with a concomitant increase in the level of Operations Tempo (OPTEMPO). There has been an overall 300% increase in military deployments compared to Cold War averages.² In fact during the forty-year period from 1949-1989, the US military was involved in only ten contingency operations, yet during the ten-year period from 1989-1999, they have been committed to forty military operations.³ Deployments of Air Force personnel have quadrupled since 1986.⁴ Simultaneously, all branches of the American military, with the exception of the Marines, have slashed forces by approximately 30-40 percent.^{5 6}

The USAF has also increasingly engaged in various low-intensity combat missions. Deployments and exercises have been conducted in regions as diverse as Bosnia, Haiti, Africa, and the Middle East. Consequently, there remains considerable debate regarding the potential negative effects from these dramatic changes in staffing and deployment ratios. For example, concerns have been expressed that increased rates of operations combined with a reduced quantity of personnel have reduced the military’s mission readiness,⁷ further underscoring recent

accidents and high-profile equipment failures.⁸ Arguments have been made, albeit controversially, that adverse effects include decreased mission readiness, lowered morale, equipment wear/strain, and an exodus of quality personnel into the civilian sector.⁹

Previous Secretaries of Defense have expressed concerns that the notable imbalance between increasing deployments and shrinking personnel numbers will impair morale and readiness.¹⁰ Many aircrews and maintenance staff spend considerable time overseas away from their home bases. Certain units even average over 100 days at deployed locations. For example in 1999 and 2000, crews of C-17, KC-135, MH-60, and C-5 aircraft ranked in the top ten of deployed aircraft units during both calendar years.¹¹ The prospect of unequal taskings and overworked personnel led to the recent employment of the Expeditionary Air Force (EAF) concept in order to share the expanding burden of regular and unpredictable Air Force, NATO, and United Nations' mission requirements.

There is actually no unique pattern of effects from the deployments of military personnel. Concerns and/or hypotheses regarding military effectiveness/readiness are complex and no single precipitating factor can be found. In fact prior research has revealed both positive and negative results on personnel and readiness from various military missions.^{12 13} Thus, accurate prediction of deployment effects requires an understanding of specific characteristics of each deployment, including length, frequency and individual circumstances.^{14 15}

Operation ALLIED FORCE and Personnel in Combat

Approximately 44% of USAF combat-ready fighter aircraft worldwide were used during Operation ALLIED FORCE (OAF) over Serbia and Kosovo, compared with 41% in the Persian Gulf War and 36% at the height of the Vietnam War.¹⁶ Thus, from an Air Force perspective, OAF was a major theater war given the percentage of aircraft utilized in the operation. The

United States and NATO aircraft flew over 34,000 sorties¹⁷ and dropped more than 20,000 bombs and rockets¹⁸ over the course of the 78-day sustained air campaign that began on 24 March 1999. The Kosovo War was initially designed to last only 3 days,¹⁹ but the tempo of operations was expanded over time when initial objectives were not met. Sortie rates increased, from approximately 250 sorties at the beginning of OAF to over 600 sorties per day during the latter stages of the conflict.²⁰

The skill and courage of the US Air Force and NATO aviators during OAF was likewise remarkable. Over eight million pounds of ordnance were dropped from aircraft operating out of Aviano Air Base, while approximately 500 SAMs were launched at friendly aircraft.²¹ Despite these numbers, there were only two coalition aircraft downed, and the 19-nation security alliance did not lose a single pilot to enemy action during the entire course of the operation. However, pilots were clearly frustrated by a variety of combat circumstances, including errant NATO strikes on refugee convoys and a rebel outpost, witnessing Serbian atrocities, guided missile problems, “aerial traffic jams” over Belgrade, antiaircraft fire, and the daily transition from fighter pilot to husband/father.²²

Aviation Issues

Morale and Motivation

The House National Security Committee has expressed concerns about the frequent and prolonged foreign deployment pattern, including their possible negative impact on personnel morale and readiness.²³ A recent assessment of 12,000 service members claims that years of Clinton Administration defense policies have lowered morale among all personnel ranks.²⁴ All

service branches are experiencing recruiting and retention problems, which have been attributed to numerous factors including morale.²⁵

During the middle stages of Operation ALLIED FORCE, Secretary of Defense William Cohen commented on the high morale of the United States Air Force, albeit with the caveat morale could be affected if air strikes continued without results.²⁶ Luckily, positive results were seen, and morale remained high throughout OAF, especially among aviators. Thus, although low morale may be caused by frequent or prolonged deployments, it is not necessarily a concomitant result of actual combat operations.

Fatigue and Sleep Deprivation

Round-the-clock air operations have become the norm. Combat operations now often focus on night flights and long-duration attack missions greater than 30 hours in length, such as noted with the B-2 during OAF.²⁷ Aircrews and support personnel must be prepared to proactively combat exhaustion and sleep deprivation since fatigue degrades human performance and jeopardizes both missions and lives.²⁸

Department of Defense requirements for “bottle to throttle” (mandated minimum time between consuming alcohol and actual flying) are more stringent than comparable federal civilian regulations.²⁹ However, fatigue can be as dangerous as intoxication. After 17 hours of sustained wakefulness, the effects on crew members is the same as having a .05 percent blood alcohol level,³⁰ while twenty four hours of sleep deprivation is equivalent to a BAC of 0.10 percent,³¹ the legal intoxication level in all 50 states.

Aviators should understand that people cannot train themselves to need less sleep, and willpower alone can not stop the inevitable need to rest.³² Sleep is the only cure, although missions will sometimes not allow this. Additionally, sleep deprivation affects both on and off

duty performance. There were two active duty deaths in theater during OAF. Both of these fatalities occurred off base in motor vehicle accidents attributed to fatigue.³³ Given extended duty hours during deployments and the time required to physically adapt to changing work schedules, prudent scheduling and behavioral fatigue management strategies are crucial for reducing risk to personnel and equipment.

Work/Family Conflict

The demands of military operations are compounded or balanced by the daily demands of family life.³⁴ Occupational and domestic stress can produce adverse effects on essential mission effectiveness.³⁵ Conversely, duty demands can negatively impact family life and relationships with loved ones. In fact stress at work or home has been causally related to aviation mishaps,³⁶ and it is an important predictor of substance use.³⁷

Pilots, as a group, are organized, restrict communication at times, and rely less on emotional support.³⁸ These qualities are not always conducive to a successful marriage. However, as discussed previously, individuals on flying status are typically reluctant to seek mental health or support services for personal or family problems. Consequently, many individuals suffer needlessly or continue to rely on existing strategies, such as compartmentalizing or avoidance, even when those strategies are no longer effective.

The air war over the republics of the former Yugoslavia was unprecedented in US military history. For one of the first times, many pilots were forced to wage a “commuter war”,^{39 40} where combat missions were flown during one shift followed by pilots returning home to spouses, children, and household chores afterward. This delicate work-family balancing act was repeated for aviators throughout the course of OAF.

The new “commuter war” brings with it unique challenges, and it will most likely become the way of the future. Advanced technology, blurred battlefields, and the changing political geography of the world mean pilots are no longer required to leave families behind once the decision is made to initiate combat.⁴¹ Increased use of “home based” assets require aircrews to personally prepare to face the increasing reality of balancing home and work issues during combat operations.

Alcohol Use/Abuse

Certainly in all three services, in every country involved in the war, there was serious drinking. The reasons for drinking are probably as numerous as the men who drank.

—World War II Flight-Lieutenant Douglas “Duke” Warren, RCAF (Ret)⁴²

Like all groups within the armed forces, military pilots consume alcohol. It is part of their culture, and it is one way aviators relax and socialize with peers. Some aviation mishaps have been associated with alcohol use,⁴³ and research has discovered a correlation between DWI convictions and significantly greater risk for pilot-error accidents.⁴⁴ However, the more important questions are whether pilots as a group abuse alcohol and/or if their use differs significantly from non-rated officers or military personnel in general. A controversial FAA project in the 1970s reported over 35% of all fatal civil aircraft accidents involved alcohol, although some critics question the validity of this percentage total.⁴⁵ Regardless, information on pilot alcohol use/abuse patterns may help mental health providers direct resources toward prevention programs.

The 1995 DoD Survey of Health-Related Behaviors Among Military Personnel revealed notable substance use in the armed forces,⁴⁶ although that particular survey did not break out aviator substance use. Many commanders now emphasize “responsible drinking.”

Consequently, although social norms within the military have traditionally encouraged alcohol use, researchers documented a decreasing trend in alcohol prevalence among military forces during the 1980s and 1990s.⁴⁷

Some authors have argued against alcohol bans imposed on US forces in certain contingencies.⁴⁸ However, compared to prior conflicts, restricted alcohol use during Operations Desert Storm/Shield and deployments in Bosnia most likely resulted in fewer alcohol-related incidents. Additionally, recent analysis has demonstrated significantly elevated rates of heavy alcohol use among deployed men and women.^{49 50} For various reasons, personnel deployed in support of military contingencies are more likely to misuse or abuse alcohol. Since a large percentage of military personnel are now sent on temporary duty (TDY) for combat and military operations other than war (MOOTW), this substance use pattern presents potential problems in regards to risk management, adverse behavioral consequences (e.g., DUI, physical altercations, tardiness), and degradation of individual and mission effectiveness.

Mental Health and Commanders/Supervisors

Commander Encouragement of Help-Seeking

The leader is necessarily one who breaks new paths into unfamiliar territory. The man who directs us along the old familiar ways is not a leader; he is a traffic cop—a useful and worthy functionary, but not inspiring.

—Gerald W. Johnson

Journals on flying safety recommend aviators seek professional help for depression or other mental health issues.⁵¹ Mental health services can reduce suffering, while ignoring personal distress can lead to various adverse outcomes, including decreased concentration, marital dysfunction, substance misuse, even suicide. Air Force Chiefs of Staff have also tried to encourage help-seeking.⁵² Despite this fact, many individuals avoid contact with mental health

providers. Aviators do not understand the military medical system,⁵³ and operational squadron commanders are often unaware of the potential benefits aviation psychologists can bring to the fight. In worst case scenarios, leaders actually discourage help-seeking, perceiving potential detrimental effects, such as the loss of an aviator's flight status. Consequently, many leaders can only see potential negative consequences from their pilots using mental health services.

Even if positive benefits are perceived, some commanders only see the more “traditional” mental health roles, such as substance abuse treatment, commander-directed evaluations, suicide prevention, and domestic violence response. Mental health personnel trained in aviation issues can be a force-multiplier for military leaders by performing both traditional and unconventional services (e.g., fatigue management, spatial disorientation, combat motivation). If performed properly, aviation psychology services should keep the vast majority of pilots in the cockpit while at the same time reducing risk. This is a win-win scenario for commanders.

The ability of pilots to organize and compartmentalize issues in their life is clearly beneficial in aviation duties, although this same tendency can be detrimental in family relationships. Successful family interactions require communication, sharing, balancing priorities, and periodically focusing on seemingly trivial issues. Additionally, marital distress has a correlation with pilot attention, situational awareness, performance decrements, and increased aviation mishaps.⁵⁴ Given the sometimes symbiotic relationship of home/work issues, commanders should understand prevention services and various authors' recommendations that the USAF employ programs in communication skills, stress management, and recognition of spousal contributions to mission safety.⁵⁵ Together with flight surgeons, aviation psychologists can perform these programs, augment aviator effectiveness, and serve as a conduit between

operational commanders and the medical community. The pilot and their spouse form a “team” the aviation leader can not ignore.

Mental Health Provider Awareness of Aviation Issues

Just as aviation squadron commanders and senior wing leaders often do not fully understand the plethora of benefits aviation psychologists can provide, traditional mental health providers typically are naïve about combat aviation and the divergent needs/issues relevant to aircrews. Military pilots have different methods of coping than the general population,⁵⁶ and different issues often need to be considered. Given flight training selection/exclusion criteria, DNIF concerns, mental health stigma, and the ability of pilots to successfully manage high levels of stress, aviators with psychiatric disabilities are rarely seen. However, compared to other medical referrals, aviators with psychiatric problems are grounded in greater proportions.⁵⁷ For mental health providers trained to assess pathology, a slightly different perspective is required.

The modal aviator by most all standards is a “psychiatrically normal,”⁵⁸ healthy individual unless proven otherwise. The role of the medical professional is not to ground flyers, since they then become useless to the commander. Consequently, the role of the provider is clearly to keep aviators in the cockpit. This is done through prevention efforts, timely and prudent interventions, and constructive recommendations. In order to serve pilots and operational commanders effectively, mental health professionals must be knowledgeable about aeropsychology issues and perform tactical interventions to benefit the flying community.

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²⁹ Harry L. Gibbons, "Alcohol, Aviation, and Safety Revisited: A Historical Review and a Suggestion." *Aviation, Space, and Environmental Medicine*, (July 1998): 657-660.

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³³ Brig Gen George P. Taylor, III, surgeon general, Air Combat Command. "Does the Air Force Medical Service Have Core Competencies?" Lecture. USAF Doctrine Center, Maxwell AFB, AL., 9 February 2001.

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⁴⁷ Ibid.

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⁴⁸ Carey Matthews, "Alcohol Ban in Bosnia is an Insult to the Troops." *Air Force Times*, vol. 56 (26 February 1996): 54.

⁴⁹ E. Belle Federman, Robert M. Bray, and Larry A. Kroutil, "Relationships Between Substance Use and Recent Deployments Among Women and Men in the Military." *Military Psychology*, vol. 12(3), (2000): 205-220.

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Chapter 3

Method

*No coward soul is mine, No trembles in the world's storm-troubled sphere: I see
Heaven's glories shine, And faith shines equal, arming me from fear.*

—Emily Bronte in “Last Lines”

Participants

A total of 957 questionnaires were distributed to various military personnel stationed either permanent party or TDY at Aviano Air Base, Italy, during Operation ALLIED FORCE. These surveys were distributed to units specifically involved in combat operations or direct support of aviation squadrons at Aviano. A total of 540 members completed the two-page questionnaire for an overall 56.4% response rate. Officers comprised 15.4% of the total sample.

Of the entire subject pool, 55 were officer aviators (pilots or flight crew members), while another 28 individuals were various non-rated officers used for comparison purposes. The job descriptions of non-rated officers participating in the study included medical (6), maintenance (5), security forces (3), weapons (1), air traffic control (1), services (1), and unspecified other (11). An analysis of the respondent sample by gender revealed males comprised 98.2% of aviators and 89.3% of non-rated officers. The majority of both groups (100% of aviators and 92.9% of non-rated officers) were in the Air Force with the remaining non-rated officers in the Marines (3.6%) and Navy (3.6%). Caucasians were the largest racial group for both aviators (89.1%) and non-rated officers (82%), followed by African Americans (2% of aviators; 3.6% of

non-rated), Hispanics (0% of aviators; 3.6% of non-rated), and “other” (9% of aviators; 10.7% of non-rated). Married respondents represented 72.2% of the total sample of aviators and 46.4% of non-rated staff. The remaining subjects were never married (20.4% aviators; 39.3% non-rated), separated (0% aviators; 3.6% non-rated), divorced (5.6% aviators; 10.7% non-rated), and widowed (1.9% aviators; 0% non-rated). A total of 61.8% of aviators and 25.9% of non-rated officers reported having children living at home at the time of the survey. Finally, examining their duty status indicated 58.2% of aviators and 42.9% of non-rated officers were assigned at Aviano AB as permanent party members. The remaining 41.8% of aviators and 57.1% of non-rated staff were TDY personnel from throughout Europe and the United States.

Procedures

Participants self-administered a two-page, 65-item self-report questionnaire that included items and scales assessing demographics, deployments, sleep, morale, psychological well-being, wellness behaviors (i.e. alcohol/nicotine/cafeine use), physical health symptoms, job attitudes and work-family conflict. The author of the current research paper, a clinical/aviation psychologist with nine years time in service distributed the questionnaires, attached with introductory/explanatory letters, to squadron commanders and first sergeants. These supervisors then disseminated surveys to personnel within their units. The U.S. Army Medical Research Unit-Europe’s OPTEMPO/PERSTEMPO research theoretical framework¹ was used as a guide in developing and refining assessment scales for this study. This particular validated framework was used because of availability and similarity to OPTEMPO items of interest in the current study. Respondents anonymously returned questionnaires to various locations throughout Aviano Air Base to ensure confidentiality.

Measures of alcohol use, sleep, morale/motivation, and work-family conflict were examined in this report because of their direct applicability to aviation safety concerns. Changes in substance use were assessed by comparing self-reported quantity of alcohol consumption of respondents prior to and during Operation ALLIED FORCE. Quantity of sleep was assessed with a single item querying respondents about their perceived average quantity of sleep achieved each night during the operation. Morale and motivation were measured using one-item questions focusing on individual morale, perceived morale within the unit, cohesion in the unit, and perceived personal level of motivation. Response items on the scales ranged from very low (1) to very high (5). The Work-Family Conflict Scale (Cronbach Alpha=.92),² an established and validated assessment tool, was used to measure the degree work interfered with family life.

Notes

¹ C. A. Castro and A. Adler, "The Impact of Operations Tempo on Soldier and Unit Readiness." *Parameters*, (1999).

² R. G. Netemeyer, J. S. Boles, and R. McMurrian, "Development and Validation of Work-Family Conflict and Family-Work Conflict Scales." *Journal of Applied Psychology*, vol. 81 (1996): 400-410.

Chapter 4

Results

A description of the demographic sample by status, aviator versus non-rated officer, is presented in Table 1. Chi Squares and independent-sample t-tests were run to identify differences in basic demographic variables. Chi Square are used for non-parametric nominal-level measurements, while independent sample t-tests are used when scores in one group have no logical relationship with scores in other measured groups. An analysis of the two groups indicated they were similar in ethnicity, gender, and service branch distribution. The majority of participants were Caucasian, male Air Force members. There were non-significant differences in the two groups regarding deployment status (permanent party versus TDY) and marital status, with aviators slightly more likely to be permanent party (58.2% versus 42.9%) and married (72% versus 46.4%). Additionally, aircrews were significantly more likely to have dependent children residing in the home ($X^2(1, N=55) = 9.33, p < .005$).

Regarding OPTEMPO measures, Table 2 highlights the significant difference in hours worked per week between officers and enlisted personnel, as well as the fact that enlisted members (E1-E9) deployed significantly less than officers during the 12 months preceding OAF. There were no statistically significant differences between aviators and non-rated officers regarding number of deployments or average number of hours worked per week during the operation other than both groups were higher than enlisted personnel.

Table 1. Basic Sample Demographics

		<i>Pilot/Aircrew</i>		<i>Non-Rated Officer</i>	
		n=55	(xx%)	n=28	(xx%)
		n	%	n	%
Age (mean in years)		33.1		31.7	
Gender					
	Male	54	98.2	25	89.3
	Female	1	1.8	3	10.7
Rank					
	O1-O3	36	65.5	20	71.4
	O4-O7	19	34.5	8	28.6
Race/Ethnicity					
	Caucasian	49	89.1	23	82.1
	African American	0	0.0	1	3.6
	Hispanic	0	0.0	1	3.6
	Other	2	3.6	3	10.7
	Unspecified	4	7.3	0	0.0
Component					
	Air Force	55	100	26	92.9
	Navy	0	0.0	1	3.6
	Marines	0	0.0	1	3.6
Status					
	Permanent Party	32	58.2	12	49.9
	TDY	23	41.8	16	57.1
Marital Status ¹					
	Single (Never Married)	11	20.0	11	39.3
	Married	39	79.9	13	46.4
	Separated/Divorced	3	5.5	4	14.3
	Widowed	1	1.8	0	0.0
Dependent Children at Home ²					
	Yes	34	61.8	7	25.0
	No	21	38.2	20	71.4

¹One aviator did not specify his/her marital status

²One non-rated officer did not specify whether any children resided in the home

Morale/Motivation

Given that morale was measured by individual one-item questions with a Likert-type response choice, the Mann-Whitney U was used for analysis to compare the two groups.¹

Personal morale (U=626.00; p<.05), unit morale (U=417.50; p<.001), unit cohesion (U=443.50;

Table 2. OPTEMPO Measures by Rank

RANK	AVERAGE # OF HOURS (Means) WORKED PER WEEK	TOTAL # OF DEPLOYMENTS IN PAST 12 MONTHS
E1 – E4	67.82	1.03
E5 – E6	67.88	1.22
E7 – E9	68.09	0.81
O1 – O3*	72.43	2.36
O4 – O7*	75.23	1.85

*p<.05

p<.001), and personal level of motivation (U=628.00; p<.05) were all significantly higher for aviators versus non-rated officers. Table 3 summarizes the differences noted among participants responding either “high” or “very high” to each of the queried items of personal morale, unit morale, unit cohesion, and personal level of motivation. These Likert-type scale ratings were used to reflect elevated morale, cohesion and motivation levels for analysis.

Table 3. Subject Sample Morale/Cohesion/Motivation Differences

	AIRCREW	NON-RATED OFFICER
Personal Morale*	75.5	50.0
Morale in Unit*	77.6	35.5
Cohesion in Unit*	87.8	52.9
Level of Motivation*	75.5	55.9

Percent of officers responding “high” or “very high”

*p<.05

Sleep

Levene's Test for Equality of Variances revealed aviators on average obtained significantly more hours of sleep per night (7.2; SD=1.06) than other non-rated officers (5.9; SD=1.22) ($F=.102$; $p<.001$). Levene's Test is used when groups do not contain the same number of subjects, yet the researcher is obligated to test the assumption of equal variances.

Work-Family Conflict

Independent-samples t-tests (scores in one group have no logical relationship with scores in other groups) were run for respondents with family members (i.e., married and/or children) to evaluate differences in work-family conflict. There were no statistically significant differences among the two groups, although aviators reported slightly higher levels of conflict (aviators=20.18; non-rated=17.94). Because of differences between officers, an enlisted comparison was made. Consequently, there was a negative relationship between work-family conflict and personal morale ($r = -.36$, $p<.01$), unit morale ($r = -.34$, $p<.01$), personal motivation ($r = -.27$, $p<.01$), and unit cohesion ($r=-.23$, $p<.01$) for the E1-E4s in the original sample. However, there were no similar relationships for E5 to E9s or officers in either category (aviator vs. non-rated).

Alcohol Consumption

Analysis of wellness behavior assessed changes in alcohol use over time (prior to military operations and during Operation ALLIED FORCE). Specifically, participants reported the average number of alcoholic drinks (glass of wine, bottle of beer, or liquor shot) consumed per week at each point in time. Generally, single-source, self-report measures of substance consumption often have questionable validity given member's tendency to minimize use. However, anonymity for respondents, as was ensured in the current study, has been shown to

reduce potential self-serving bias in this form of data collection. Although increasing during the course of the war, there were no statistically significant differences between the average alcohol consumption of aviators before (5.44) and during (8.2) Operation ALLIED FORCE. Among all officers during the operation, alcohol consumption per week was higher for personnel on TDY (11.1) than those on permanent party status (5.2), $t(64.9, 81) = -2.6, p < .05$. An unequal variance t-test was used because of the assumption that each group had different degrees of variability in their scores. Non-rated officers also reported a non-significant increase in weekly alcohol consumption during the operation from an average (mean) 4.15 pre-operation alcohol drinks weekly to 8.18 drinks average during OAF.

There were no reported alcohol-related incidents or treatment referrals for either officer group between March and June 1999 during Operation ALLIED FORCE. Twenty-five enlisted alcohol treatment referrals were made at Aviano Air Base during OAF in 1999, although the base literally doubled in size to approximately 8,000 personnel during OAF. A review of Aviano Air Base Alcohol Drug Abuse Prevention and Treatment (ADAPT) data for the comparable period Mar-Jun 2000 revealed one female non-rated officer alcohol misconduct incident out of 36 total incidents in that particular four-month time frame.

Notes

¹ Sidney Siegel, *Nonparametric Statistics for the Behavioral Sciences*. (New York, NY.: McGraw-Hill Book Company, 1956).

Chapter 5

Discussion

Aviators and non-rated officers were a relatively homogenous group of individuals, with the only significant difference being children residing in the home. Aircrews more often reported being married, permanent party status, and having dependent children living at home. All of these factors may account for the increased level of work-family conflict, as aviators were forced to balance the demands of both roles. Aircrews were continuously asked to risk their lives in combat then return home to family duties in the “commuter war.” Mental health providers visited the elementary and junior high schools during the war in an effort to reassure the children and address their concerns. During these visits, younger youth asked questions about deaths of children in Kosovo, risk to parents, and dangers to themselves given the constant Italian protests, news reports, threats against U. S. personnel, vandalism, and arson attacks on American vehicles. Despite reduced time at home, active duty parents obviously had to likewise comfort their children while continuing to stay focused on duty demands, further increasing demands and stress upon personnel with families.

This author expected to find more significant differences in work-family conflict between the two groups. It was believed that aircrews would experience increased conflict while attempting to balance the demands of this relatively new “commuter war” situation. Since aviators were more likely to be permanent party personnel, the difficulty of simultaneously

attending to work and family issues in the same day was expected to stress the normally highly effective coping strategies of pilots. Possibly, significant differences in work-family conflict did not occur because of the relatively short duration of the war combined with the extensive support services available on base (e.g., aviation psychology, mental health outreach, Family Support Center programs, chaplain, squadron activities). Additionally, aviators' tendency to compartmentalize, use humor, and ensure as much time as possible was spent with family members all likely contributed to overall positive results.

Not surprisingly, aviators reported higher levels of personal morale, motivation, unit morale, and unit cohesion. Regardless of hypotheses by some authors about current DoD recruitment and retention problems, pilots are generally a proud group, dedicated to their missions and each other during times of war or conflict. They frequently bond with each other given shared common practices, skills, and risks. There is a sense of camaraderie with other aviators. Unlike other supporting career fields, pilots also directly see the outcome of their actions in combat, noting the specific value of the work and how it contributes to mission success. Additionally, the war was of relatively short duration, its outcome was one-sided in our favor, and no pilots were lost to enemy action despite over 30,000 sorties flown. Collectively, these factors may all explain why morale, motivation, and unit cohesion of aviators remained high throughout OAF.

Conversely, non-rated officers may not always see a tangible outcome on the "war effort" from their actions. They may be multi-tasked and/or drawn into projects unrelated to their AFSC. Their increased likelihood of being on TDY status probably impacted unit cohesion and morale, as these individuals were forced to integrate with other members from a variety of bases. Finally, non-rated officers can experience reduced sleep given the absence of mandatory crew rest cycles, further impacting personal morale and motivation. As crews push themselves

through extended work hours and sleep deprivation, irritability and decreased frustration tolerance can occur.

Contrary to the belief held by some individuals that multiple contingency operations have reduced military morale, prior deployment experience in the twelve months preceding OAF was actually positively correlated with higher personal morale, motivation, unit morale, and unit cohesion. Individuals with prior deployment experience reported significantly higher levels of unit morale and unit cohesion. Although higher for deployed members, differences were not statistically significant in regards to personal morale. However, individuals with one prior deployment reported higher morale levels than those with no previous ones, and individuals with multiple prior deployments had higher morale than people with single or no previous contingency experience. Since some critics have suggested decreased morale and excessive operational commitments have produced an exodus of quality military members into the civilian community, current results suggest factors other than or in addition to military deployments may better account for current Air Force retention problems.

Aircrews obtained significantly more hours of sleep per night on average than non-rated officers. This result was expected, given mandatory crew rest and intentional gaps between scheduled subsequent missions of the same pilots. Non-rated officers may not have received sufficient sleep given mission requirements, individual decisions to work extended hours, and the absence of DoD guidance mandating minimum rest periods for non-rated officers. Furthermore, non-rated officers were more likely to be housed in “tent city.” This housing area was built near the end of the runway at Aviano Air Base for many of the 4,000 person influx of temporary personnel arriving during OAF. Permanent party aviators resided in homes on the Italian

economy, while TDY aviators were typically housed in hotels in the community. These arrangements for fliers enhanced sleep opportunities.

Fatigue initially became a problem for aviators early in OAF, as evidenced by increasing requests for “go” pills during operations. Fatigue also adversely impacts concentration, attention and vigilance. Consequently, some pilots bumped their heads on munitions and airframes while walking around the aircraft during preflight. However, education and changes in scheduling reduced the sleep deprivation problem. Pilots and commanders were briefed on problems with recommendations for sleep hygiene and consistent (i.e., not frequently rotated) schedules. Additionally, squadron pamphlets and a regular newsletter were created to educate aviators and support staff on various topics, such as fatigue, stress, and motivation.

Non-rated officers’ sleep cycles could clearly be adversely impacted by jet noise, communal living conditions, multiple duty demands, and the population noise factor at tent city. Even though there are variations, the average adult requires 7-9 hours of sleep per night in order to remain fully alert.¹ Actual combat conditions may reduce the overall need for sleep for limited duration, but non-rated personnel stationed in Italy clearly were not facing life-threatening conditions. Thus, reports of an average 5.9 hours of sleep per night by non-rated officers during OAF preclude effective duty performance over time. Lessons from OAF suggest commanders of all personnel should carefully review work schedules during deployments, advocate sufficient rest cycles, and exercise extreme caution when military operations become protracted.

Pilots and non-rated officers both increased average weekly alcohol consumption during ALLIED FORCE compared to subjective reports of pre-OAF levels. However, there were no complaints of excessive substance consumption among officers. There was likewise no increase in reported alcohol incidents or referrals to the Aviano Air Base Substance Abuse Clinic for

either pilots or other officers. A confounding variable was the off-base housing arrangements of certain officers during OAF, since this reduced temptations and direct exposure/access to alcohol for those members residing in tent city. Unlike some non-rated officers and the vast majority of TDY junior enlisted personnel required to dwell in tents or, less frequently, temporary dorms on base, aviators generally lived in the community in rented homes or hotels. Consequently, although significant alcohol increases were observed among enlisted ranks during ALLIED FORCE, the same was not true for aviators and non-rated officers. Alcohol was plentiful and readily accessible in tent city for OAF personnel at Aviano Air Base. Numerous service recreation tents, unit “hooches,” bars in the local community, and personal supplies of alcohol provided daily temptations for those residing in tent city during the war. In one service tent alone there was a reported 65-80 cases of beer sold daily. Commanders were aware of these numbers, but no attempt was made to restrict alcohol access in tent city. However, given no discernable increase in incidents or ADAPT referrals during OAF, the potential impact of restrictions is unclear.

Notes

¹ John Caldwell, “Fatigue Facts for Aviators...and Everybody Else!” *Flying Safety*, (September 1998): 20-25.

Chapter 6

Conclusions and Recommendations

The results of this study are consistent with prior research on US Army personnel suggesting both negative and positive aspects of deployments on personnel and mission readiness.¹ Officers in general were high functioning individuals with few noted problems during Operation ALLIED FORCE. Aviators had higher morale, motivation, and unit cohesion during combat. Additionally, the concurrent demands of work and domestic life resulted in slightly higher levels of work-family conflict for these individuals. However, there is clearly no evidence to support one myth that aviators are prone to abuse alcohol. Although alcohol consumption increased for both groups during the war, neither group used these substances excessively before or during the operation.

Limitations to the study are the restricted number of subjects in the study, reliance on self-report data, and the absence of pre-OAF data (i.e., fatigue, morale/motivation, alcohol use, work-family conflict) or a follow-up questionnaire to assess long term effects. Future research with increased numbers of subjects may yield divergent results.

This author has several additional recommendations. Current results should be compared to future conflicts, and CONUS-based crews (e.g., B-2 missions from Whiteman AFB) should be contrasted with those flying from overseas bases. Additionally, future research should examine TDY versus permanent party aviator differences and expand the number of variables assessed in

order to reduce overlooking potentially important aviation issues. Other possible variables include comparisons to enlisted personnel, wellness behaviors of tobacco/caffeine consumption, health issues, fitness, command relationships, and work shift measures.

Regardless of overall survey results, there is clearly a place for trained aviation psychologists within the Air Force for analysis of human factors and intervention with aviators. Future military campaigns should further demonstrate this point. The Army and Air Force recognize the value these individuals bring to the fight, as evidenced by both short-duration training programs and post-doctoral opportunities. Unfortunately, few designated aeropsychology positions exist, commanders are often not aware of these services, and annual flight psychology postdoctoral fellowships within the Air Force sometimes go unfilled because no provider expressed an interest. There is also a disconnect between the need for services and the knowledge traditional mental health providers have of aviation issues. This author recommends better publicity of the various education opportunities available to mental health providers and/or possible mandated training. Perhaps the Air Force can establish a brief training program similar to the 3-week Army aviation psychology course at Ft Rucker, Alabama or even mandate Air Force providers attend the Army training course. Additionally, this author recommends some form of aeropsychology training for all members of the three Air Force psychology interns at Lackland AFB, Andrews AFB, and Wright-Patterson AFB.

Leaders should advocate all active duty mental health providers receive aeropsychology training since all providers will almost certainly be assigned at some point in their careers to a base with aviation assets. Understanding aviation and flight human factor issues will increase their effectiveness with this unique population. Additionally, positions designated 42P3D (aeropsychology) should specifically be created at more bases to focus providers on the need to

emphasize this critical aspect of services. Another incentive idea is for the Air Force to establish a Biomedical Sciences Corp (BSC) medical badge with “wings” similar to that approved by two of the five medical corps for flight surgeons and flight nurses. The Army already allows this for their psychologists. Although seemingly superficial, a BSC badge with wings for qualified individuals might motivate more providers to seek training in order to obtain this exclusive “symbol.” A modified corp badge may also reduce perceived barriers between the flying community and mental health providers as aviators see similarities between psychologists and flight surgeons. The emphasis of these initiatives should be on making help-seeking more tenable to aviators and providing services relevant to the population served.

Aviation psychologists overlap skills with both traditional mental health providers and flight surgeons. However, flight psychologists also provides unique services and human factors knowledge that can clearly assist operational commanders and augment services provided by other medical professionals. Aviation psychologists will never replace flight surgeons, so there is no reason for this latter group to feel threatened. The salient points are that these two groups must work collectively to better serve air crews, and additional trained aviation psychologists are clearly needed. The human weapon system is too valuable to ignore.

Notes

¹ A. H. Huffman, A. B. Adler, and C. A. Castro, “The Impact of Deployment History on the Wellbeing of Military Personnel.” Paper presentation. American Psychological Association annual convention, Boston, MA., August 1999.

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